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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
The Development of Operational, Technical, and	)	
Spectrum Requirements for Meeting Federal, State	)	WT Docket No. 96-86
and Local Public Safety Agency Communications	)	
Requirements Through the Year 2010	)	

To: The Commission

REPLY COMMENTS OF APCO IN RESPONSE TO FOURTH NOTICE OF PROPOSED RULEMAKING

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SUMMARY

The Comments of other parties emphasize once again the broad support for Project 25 Phase I as the Interoperability Voice Standard. The Public Safety National Coordination Committee's recommendation in that regard has the support of state and local governments, public safety associations, Federal agencies, and equipment manufacturers. Project 25 Phase I can be implemented on 12.5 kHz channels in the Interoperability portion of the band, while providing a common mode of operation to tie together otherwise incompatible future 6.25 kHz technologies operating in the General Use Channels.

While the Forestry Conservation Communications Association, *et al.*, advocates TETRA as an alternative to Project 25 Phase I, they overlook the significant drawbacks of TETRA as an interoperability standard. In particular, TETRA does not provide effective direct "unit-to-unit" communication in a spectrum efficient manner, and must still overcome significant power restrictions. Claims that TETRA is less expensive also overstate the cost of Project 25 equipment (by citing trunked rather than conventional equipment costs) and understate the total cost of a TETRA system, which will typically require significantly more infrastructure than a comparable Project 25 system.

As APCO and others urged in initial Comments, any mandatory migration to 6.25 kHz technology should focus on the General Use channels (where efficiency is a higher priority), not on the Interoperability channels. However, requiring 6.25 kHz capability from the outset is premature and would either delay implementation of public safety systems while technology develops, or force public safety users into a particular technology that may not be appropriate for their needs or budgets.

The Commission should also adopt the Project 25 digital narrowband data standard. Contrary to some suggestions, that standard was recommended after careful deliberation with appropriate consideration of potential data applications.

Finally, APCO joins once again with others to urge that the Commission require all Regional Planning Committees to use a common "pre-coordination" database.

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The Association of Public-Safety Communications Officials-International, Inc. ("APCO") hereby submits the following Reply to Comments submitted by other parties in response to the Commission's *Fourth Notice of Proposed Rulemaking*, FCC 00-271, released August 2, 2000, ("*Fourth NPRM*"), in the above-captioned proceeding.

I. THERE IS BROAD SUPPORT FOR PROJECT 25 PHASE I AS THE DIGITAL VOICE INTEROPERABILITY STANDARD.

As APCO explained in its initial Comments, the most time-sensitive and important issue in the *Fourth NPRM* is the adoption of a digital interoperability standard for the Interoperability channels in the 700 MHz public safety band. The Public Safety National Coordination Committee ("NCC"), a Federal Advisory Committee with representatives and participants from all elements of public safety communications, has recommended Project 25 Phase I as that standard.[1] In the *Fourth NPRM*, the Commission "tentatively" agrees with that recommendation. The comments submitted in

[1] While "Project 25 Phase I" is a convenient shorthand description of the standard, it is more properly and accurately identified as the ANSI-102.BAAA-1 Common Air Interface and ANSI-102.BABA Vocoder.

response to the Fourth NPRM provide further affirmation of the public safety community's broad support for Project 25 Phase I as the Interoperability channel standard.

Thus, now is the time to act. Any further delay will postpone public safety implementation of the 700 MHz band and endanger the safety of life, health, and property. As stated by the City of Houston Fire Department:

> Regulatory delays have drawn out this proceeding long enough. The Houston Fire Department is blocked from using spectrum crucial to its mission simply because equipment cannot be developed until the digital interoperability standard has been established by the Commission. Houston Fire urges the Commission to adopt the NCC's recommended digital interoperability standard immediately so that we can finally have true access to the 700 MHz band.[2]

Others who have reaffirmed their support for Project 25 Phase I as the digital standard for Interoperability channels include state and local governments, such as the State of Ohio, State of California, State of Florida, City of Mesa, County of Orange, and City of College Station,[3] and organizations representing public safety users, such as the International Association of Chiefs of Police, the Federal Law Enforcement Wireless Users Group, the Public Safety Wireless Network, APCO, and the NCC itself. Support for Project 25 Phase I as the voice standard for Interoperability channels is also unanimous among all of the major manufacturers of U.S. public safety radio equipment filing comments: E. F. Johnson, Com-Net Ericsson, Motorola, and Kenwood. Even Nokia and other manufacturers who advocate the European TETRA standard accept

[2] Reply Comments of the City of Houston Fire Department, filed October 6, 2000.

[3] See also Comments of New York State Technology Enterprise Corporation; Comments of David Buchanan, Chairperson of Region 5 700 MHz Public Safety Regional Planning Committee; and Comments of Ronald J. Gillory, Jr., Convenor of Region 51 700 MHz Public Safety Regional Planning Committee (noting the availability of 700 MHz spectrum in the Houston area and need for immediate FCC action).

Project 25 Phase I at least as an "interim" standard. They acknowledge that "there remains significant technical development to achieve 6.25 kHz voice efficiency with equipment operating in the conventional terminal-to-terminal mode."[4]

Several parties who support adoption of Project 25 Phase I on Interoperability channels, including the NCC, also agree with APCO that any migration to "more efficient" technology providing one voice channel per 6.25 kHz of spectrum (referred to herein as "6.25 kHz technology") should first occur in the General Use channels, not the Interoperability channels.[5] As explained by the International Association of Chiefs of Police, "[a]s the 700 MHz band becomes occupied, the need for spectrum efficiency and migration to 6.25 kHz will be greatest in the General Use channels . . . while the 2.5 MHz of Interoperability spectrum will likely be more than adequate to address interoperability needs far into the future."[6]

II. TETRA IS NOT A VIABLE OPTION AS AN INTEROPERABILITY STANDARD.

The only objection to immediate adoption of Project 25 Phase I for Interoperability voice channels is found in the Joint Comments of Forestry Conservation Communications Association, *et al.*,[7] (hereinafter "Joint Comments"). They claim that Project 25 Phase I does not meet the Commission's efficiency goals, and that it would impose additional costs on users. Thus, they suggest that the Commission should either

[4] Comments of Nokia, Inc. at 11. Within the Project 25 process, the TETRA manufacturers have agreed to include Project 25 Phase I as an interoperability mode in their Project 25 Phase II (*i.e.*, 6.25 kHz) offering.

[5] Comments of NCC at 9. *See also* Comments of State of California at 13-14.

[6] Comments of International Association of Chiefs of Police at 3.

[7] Joint Comments of Forestry Conservation Communications Association, International Association of Fire Chiefs, Inc., International Association of Fish and Wildlife Agencies, International Municipal Signal Association, and National Association of State Foresters.

permit analog operation on the Interoperability channels (an option rejected by the Commission in the *Second Memorandum Opinion and Order*),[8] or adopt the TETRA standard, an approach that even the TETRA manufacturers recognize as premature.

On the issue of efficiency, Project 25 Phase I meets the 4.8 kbps/6.25 kHz efficiency guideline contained in the Commission's rules, though it does not satisfy the goal of providing one voice channel per 6.25 kHz of spectrum. The Joint Comments suggest that the Commission reject Project 25 Phase I on that basis alone. However, the principal purpose of the recommended standard is to promote *interoperability*, which sometimes requires operation at the "lowest common denominator" to ensure that *all* users will be able to communicate with each other, regardless of their choice of vendor or technology. On Interoperability channels, efficiency is obviously important, but it cannot be pursued at the expense of undermining interoperability itself. As APCO and many others explained in their initial comments, there is no 6.25 kHz technology that can (or likely, ever will) provide interoperability across various TDMA and FDMA technologies. Furthermore, near-term implementation of the 700 MHz Public Safety band requires immediate adoption of an available ANSI standard.

Of course, the Commission should not abandon its efforts to encourage more spectrum efficient public safety operations in the 700 MHz band. However, rather than using the Interoperability channels as the vehicle for that encouragement, the Commission should focus attention on the General Use portion of the band, where there is more likely to be spectrum congestion over time.

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[8] *Second Memorandum Opinion and Order*, FCC 00-264, released August 1, 2000, at ¶10.

A major concern in the Joint Comments, which is also noted by the North America TETRA Forum ("TETRA Forum"), is the potential cost of 700 MHz radio equipment. APCO obviously shares that concern, but disagrees with the suggestion that a TETRA standard would necessarily be less expensive than Project 25 Phase I to implement. As a preliminary matter, the TETRA Forum is comparing apples and oranges when it states that the "typical *basic analog* VHF *conventional* radio cost between $400 and $1,000 plus a small accompanying infrastructure cost" and that "Project 25, Phase I *trunked* radio equipment radio can cost between $2,000 and $4,000 as well as a large accompanying infrastructure costs."[9] Regardless of the standard selected, virtually any digital radio *today* will cost more than an analog radio, and virtually any trunked radio will cost more than a conventional radio. Those differentials will probably change over time, however. In any event, the NCC's recommended interoperability standard is for conventional, not trunked operation. Conventional Project 25 radios are already available for well under $2,000.

The TETRA Forum claims that Project 25 is more expensive because of a lack of competition, asserting that Motorola is the only supplier of Project 25 trunked infrastructure, and that Motorola and E. F. Johnson are the only providers of Project 25 trunked subscriber units. In fact there are many companies that are producing Project 25 equipment or have announced plans to do so in the very near future. These include ADI Limited (infrastructure), Daniels Electronics (infrastructure), King Communications USA (infrastructure), Relm Wireless/BK Radio (infrastructure and subscriber units), Kenwood (subscriber units), Racal (subscriber units), Datron (subscriber units), Motorola

[9] Comments of TETRA Forum at 7-8 (emphasis added).

(infrastructure and subscriber units), and E. F. Johnson (infrastructure and subscriber units).[10] While some of these companies are not yet producing trunked equipment, that is due in part to the later completion of Project 25 trunking standards (which are not included in the interoperability standards proposed for FCC adoption).[11] In addition Project 25 Phase II, which will provide for multi-mode (12.5/6.25 kHz) radios, promises to expand the number of manufacturers producing equipment with Project 25 capability to include Com-Net Ericsson and European manufactures of TETRA equipment.

APCO, whose members are the consumers of public safety radio equipment, would obviously prefer that there be even more competition, with no single company holding a dominant market share. However, APCO is confident that Project 25 will actually promote, not inhibit such improved competition. Holders of intellectual property rights in Project 25, an ANSI standard, must license those rights on fair, reasonable, and non-discriminatory terms to other, competing manufacturers.[12] That process has already led several of the companies listed above to enter the U.S. public safety market, relying on Project 25 as a foothold to challenge Motorola's historic dominance. Use of Project 25 Phase I as the common interoperability mode will also allow multiple, competing 6.25 kHz technologies to develop without sacrificing interoperability. The alternative, advocated in the Joint Comments, is the premature

[10] Additional companies are building and selling ancillary Project 25 equipment such as aircraft radios (Technisonic Industries and Wulfsberg Electronic) and test equipment (IFR Systems).

[11] Both E. F. Johnson and ADI have announced in public meetings their intention to produce Project 25 trunked infrastructure.

[12] From its inception, the Project 25 Steering Committee imposed similar IPR licensing requirements on participating companies.

selection of a single 6.25 kHz technology to the exclusion of others that may be more efficient, economical, and functional.

Finally, the Joint Comments make an unsubstantiated assertion that Project 25 subscriber radios range in cost from "$3-4,000 compared with $800-2000 for a comparable TETRA unit" in Europe. As noted above, Project 25 conventional radios are already available for well below $2,000. In any event, the Joint Comments ignore the fact that the Project 25 market is still new, and that costs will likely diminish with greater volume. More importantly, the cost differential between Project 25 and TETRA (and other time division technologies) is not simply a matter of subscriber equipment. Infrastructure costs are likely to be significantly higher for TETRA than Project 25 due to larger number of transmitter sites required to cover the same geographic area. In particular, the lack of direct "unit-to-unit capability" for TETRA (discussed below in further detail) requires more intensive and comprehensive transmitter placement to preserve communications between personnel in the field. This factor could make TETRA systems overall (including both infrastructure and subscriber units) prohibitively expensive for rural and other wide area systems in the U.S. that cover sparsely populated areas.

Furthermore, TETRA's inability to support wide area simulcast communication on a single channel makes it spectrum inefficient for wide area systems. TETRA can provide wide area coverage only by multicasting the same information on multiple 25 kHz channels at different sites throughout the service area. In contrast, Project 25 Phase I simulcast operation requires only a single 12.5 kHz channel per talkpath throughout the coverage area. As described in detail in the NCC Recommendations and the *Fourth*

NPRM (at ¶ 44), TETRA is also subject to significant power restrictions that will limit its effectiveness for mobile and portable radios.

The lack of effective direct "unit-to-unit" communication in TETRA equipment, acknowledged by Nokia in its comments, is a major impediment to using TETRA as an interoperability standard. "Unit-to-unit communications" in this context is not limited to just one radio talking directly to another radio without the aid of infrastructure. The term also includes the common scenario where a single portable or mobile radio must communicate directly (*i.e.*, without going through infrastructure) with many other radios at the same time. For example, a fire commander giving direction to all of the firefighters and other personnel at the scene of an emergency. Interoperability is especially important in those contexts where the emergency responders are from different agencies or jurisdictions.[13] This would certainly be true for forest fires (which often occur where infrastructure is limited or non-existent), natural and man-made disasters (which can also occur in remote areas), major building fires, and other events that threaten life and property. Similarly, police officers from adjoining and overlapping jurisdictions need "unit-to-unit" interoperability as described above in pursuits, hostage and barricade situations, drug enforcement activities, crowd control, and other law enforcement actions. Thus, all public safety radios implemented in the 700 MHz band must have true "unit-to-unit" interoperability, something that TETRA does not provide in an effective or spectrum efficient manner.

[13] *See* Final Report of the Public Safety Wireless Advisory Committee, Interoperability Subcommittee Final Report, Volume 2, pp. 302-306 (September 1996) discussing the importance of interoperability between mobile and portable radios.

III. MANDATING ONE VOICE CHANNEL PER 6.25 kHz ON GENERAL USE CHANNELS IS PREMATURE.

APCO's initial comments recommended that that the Commission maintain Project 25 Phase I as the Interoperability standard for the foreseeable future, and that the Commission implement a 6.25 kHz migration plan for the General Use channels. Under APCO's proposal, 700 MHz voice radio equipment would be required to have 6.25 kHz capability by a date certain (December 31, 2006, or once the band is cleared in a specified number of major metropolitan areas, whichever is later). Until then, however, 700 MHz equipment could be implemented without having 6.25 kHz capability (assuming that it provides 9.6 kbps per 12.5 kHz). This flexibility is important to facilitate near-term implementation of the 700 MHz band in geographic areas that are not completely encumbered by co-channel or adjacent-channel television stations.[14] Public safety users should not have to wait for the further development of 6.25 kHz technology.

Two manufacturers suggest in their comments, however, that the Commission should require from the outset that voice channels in the General Use portion provide 6.25 kHz capability (*i.e.*, one voice channel per 6.25 kHz).[15] APCO opposes that approach as it would either (a) cause delay in implementation of 700 MHz band equipment until 6.25 kHz technologies are further developed, or (b) force near-term users to select TETRA for General Use operations, as it is the only "existing" 6.25 kHz technology.

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[14] *See, e.g.*, Reply Comments of City of Houston Fire Department, filed October 6, 2000.

[15] Comments of Com-Net Ericsson at 18; Comments of Nokia at 2.

APCO believes that, for some (primarily urban) public safety agencies, TETRA may eventually prove to be a viable technology choice for operations on General Use channels. However, it is premature (and hardly pro-competitive) to force public safety users into choosing TETRA, which, as noted above, still has significant problems related to direct "unit-to-unit" operation, power levels, and spectrum efficiency. A better option for some users will be to start with available 12.5 kHz technology in both Interoperability and General Use channels, and then migrate over time to 6.25 kHz General Use operations once technology develops and more choices are available.[16] Others may be able to wait for 6.25 kHz options to develop, or may be forced to wait due to broadcast station use of the spectrum. In any event, the Commission has wisely chosen not to dictate a specific technology or standard for the General Use channels, and should continue to refrain from doing so, directly or indirectly through premature imposition of 6.25 kHz efficiency requirements.

IV. THE COMMISSION MUST ADOPT THE NCC'S RECOMMENDED NARROWBAND DIGITAL DATA STANDARD.

Two manufacturers have challenged the selection of the Project 25 as the narrowband data interoperability standard, despite wide support among public safety users and other parties. Com-Net Ericsson and Dataradio Corporation (Dataradio) question whether the NCC, in makings its recommendation, had examined the type of data transmission that would be necessary for interoperability purposes. However, the NCC had indeed addressed that issue, as summarized in the "User Needs Statement of Requirements for Low Speed Data Standards on Interoperability Channels," contained in

[16] Of course, to the extent that 6.25 kHz equipment is available in the near term, users should be allowed to start with such equipment for General Use operations, so long as their equipment also has Project 25 Phase I capability on the Interoperability channels.

Appendix H of the NCC Recommendations submitted to the Commission on February 25, 2000.

APCO also notes that while it is appropriate and necessary for the Commission to adopt an interoperability standard applicable to the "transport layer" of a data communications system, the establishment of standards applicable to the "applications layer" are not a necessary prerequisite and may not be within the realm of Commission responsibilities. The "transport layer" certainly needs to support the requirements imposed upon it by the various applications, however, it also by necessity places limits on the types of applications that may be implemented. In the instant case, the narrow bandwidth data channels will be required to support only those applications having a low data throughput requirement. Other applications, requiring higher data throughputs, more appropriately will be implemented on the wide bandwidth data channels provided for within the 700 MHz Public Safety Band. Thus, by establishing a standard for the "transport layer" on the narrow bandwidth channels, it then becomes possible to allocate specific data applications to either the narrow bandwidth channels or the wide bandwidth channels based upon which bandwidth is most appropriate to the application.

The NCC's Interoperability Subcommittee performed a thorough analysis of the types of applications to be supported by the low speed data standard. The analysis resulted in six separate recommendations that needed to be supported by the data interoperability standard.[17] The recommendations, which are met by the Project 25 Data Standard, will support any type of application intended for low speed mobile data channels. These include short status messages; fill in the blank forms, and short emails.

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[17] *See* NCC Recommendations at Appendix H.

Therefore, even though the exact applications are not specified, the standard will allow transmission of any of those types of applications. To lock in a set of applications now, before there is any field experience with mobile data in interoperability operations environment would be a mistake. Yet, with a clearly defined standard the user groups, in particular the fire service, can begin developing and testing the applications. Knowing the transport standard and limitations inherent in any standard will allow the application development process to begin.

Dataradio (which has urged the Commission to allow it to market "non-standard" data equipment in the 700 MHz band)[18] also argues that the Project 25 data standard is "obsolete." However, the Project 25 standard provides 9.6 kbps speeds in a 12.5 kHz wide channel, compared to speeds on existing equipment ranging from 4.8 kbps to 19.2 kbps on 25 kHz wide channels. Project 25 is at least comparable to today's state-of-the-art systems, considering the reduction in bandwidth, and is far from an outdated standard. Furthermore, while technologies in the future might provide more throughput, the Project 25 data standard meets the identified needs for interoperability operations and allows users to begin developing necessary applications now; not at some unknown future date after some new unknown data standard is developed.

Finally, Dataradio challenges the procedures utilized by the NCC in adopting the standard. However, the NCC conducted open proceedings and provided ample opportunity for the presentation and discussion of alternative standards. Dataradio representatives participated in those sessions, but neither it nor any other party proposed a

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[18] *See Public Notice*, DA 00-230, released February 9, 2000.

narrowband digital data standard other than Project 25. As described in Appendix I of the NCC Recommendations:

> At the NCC meetings held on January 13-14, 2000, in Washington, DC, manufacturers and other committee participants were asked to recommend alternative technologies that could be used to satisfy the data interoperability requirements. Discussions ensued amongst Committee members via the Sub-committee list server and continuing through the January 27 meeting. As a result of these discussions, only one technology was suggested. This technology was evaluated for compliance with the operational requirements and was found to be compliant. In arriving at consensus to make the following recommendation, no objections were expressed by any participant.

V. THE COMMISSION MUST MANDATE USE OF A COMMON "PRE-COORDINATION DATABASE.

There was support from a variety of public safety entities for the NCC's recommendation that the Commission require all Regional Planning Committees ("RPCs") to utilize a common "pre-coordination" database. In addition to APCO and the NCC itself, comments supporting such a mandate were filed by the State of Ohio, the State of California, the County of Orange, the City of College Station, the Public Safety Wireless Network, and the National Public Safety Telecommunications Council, which stated that a "Commission mandate that all RPCs and the four Public Safety Coordinators use this database is essential for effective, efficient and successful implementation of the 700 MHz band." [19] As the State of California noted, if "one of the parties decides that his/her group can 'go it alone'... the integrity of the information available to all of the parties is compromised."[20] The Commission need only look as far as the protracted

[19] Comments of the National Public Safety Telecommunications Council at 8.

[20] Comments of the State of California at 18.

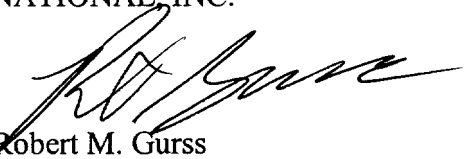
dispute between Regions 20 and 28 in the 800 MHz "NPSPAC" band[21] to find an example of what can occur when groups planning spectrum for contiguous areas do not share information and operate from a common database.

CONCLUSION

For the reasons stated above and in APCO's initial Comments, the Commission must move forward immediately to finalize interoperability standards for the 700 MHz band, and to otherwise implement the recommendations of the Public Safety National Coordination Committee.

Respectfully submitted,

ASSOCIATION OF PUBLIC-SAFETY COMMUNICATIONS OFFICIALS-INTERNATIONAL, INC.

By: 

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[21] Washington, D.C. Metropolitan Area Regional Public Safety Plan (Region 20); Philadelphia Metropolitan Area Regional Public Safety Plan (Region 28), Gen. Docket Nos. 90-7 and 89-573, *Order*, 14 FCC Rcd 17712 (Oct. 22, 1999).